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Comparative Analysis of Informal Vendors around Dhaka Metro Stations through a Sustainable Livelihood Framework

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ABSTRACT

Dhaka's urban landscape is undergoing rapid transformation with the introduction of the Metro Rail, reshaping mobility patterns and influencing informal economies. This study investigates how the establishment of Farmgate and Mirpur-10 metro stations has affected the livelihoods of informal vendors, applying the Sustainable Livelihood Framework (SLF) as an analytical lens. A mixed-method research design was adopted, combining structured questionnaires, semi-structured interviews, field observations, and photographic documentation with statistical analyses. Fifty vendors were surveyed across the two sites, and independent sample t-tests were performed to compare livelihood outcomes. Results indicate that vendors who relocated their vending spaces after the opening of metro stations achieved significantly higher SLF scores ($p < .01$), reflecting improved access to financial and social capital. In contrast, vendors who started business after the metro inauguration reported comparatively lower livelihood scores, suggesting vulnerabilities linked to competition, limited infrastructure, and regulatory constraints. Findings underscore the dual role of transport infrastructure as both an enabler of opportunity and a source of precarity for informal workers. The study highlights the necessity of inclusive urban policies, particularly through designated vending zones and supportive planning strategies, to enhance resilience and ensure equitable benefits from infrastructure-led urban transformation.

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Highlights:

- Integration of new metro stations in the urban landscape and their Impact on the livelihoods of Informal vendors in the surrounding areas.
- Examination of spatial implications of the Farmgate and Mirpur-10 metro stations on the livelihoods of nearby small-scale vendors.
- Employment of Sustainable Livelihoods Framework (SLF) to realize the livelihood conditions of the informal vendors impacted by metro stations.

Contribution to the field statement:

This study contributes to discourses on informal economies, urban mobility, urban transformations, and inclusive development, advocating policies that integrate vendors into transit-oriented development while ensuring their role in rapidly transforming cities.

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1. Introduction

Dhaka, the capital of Bangladesh, has experienced dynamic transformations over the past four centuries, with growth evident in its spatial, physical, economic, and social structures. As the city expanded, it attracted diverse populations from different backgrounds, while its organic morphology continuously shaped an urban core aligned with shifting functional centres across historical stages (Nilufar, 2011). Urban transportation infrastructure plays a pivotal role in influencing these transformations by restructuring spatial, social, and economic dynamics. Large-scale projects such as Metro Rail Systems are often introduced to reduce congestion, shorten travel times, and enhance mobility. Yet these developments also generate ripple effects on surrounding urban fabrics, particularly for informal economic stakeholders such as small-scale vendors, who remain highly sensitive to spatial and regulatory shifts (Donovan, 2008). In many developing cities, informal vending forms an indispensable component of local economies, providing affordable goods and services in areas of high pedestrian footfall such as transport hubs (Bromley, 2000). In Dhaka, vendors are ubiquitous across public spaces, contributing significantly to the urban economy, both in stationary and mobile forms (Husain et al., 2015).

The inauguration of the Dhaka Metro Rail Project—Mass Rapid Transit (MRT) Line-6, beginning in December 2022—marks a radical restructuring of the city’s transport system (Raj et al., 2024). Among its key nodes, Farmgate and Mirpur-10 have long been characterised by intense pedestrian flows, dense informal economies, and complex social interactions. Farmgate serves as a central commercial and transport hub with a diverse mix of activities, while Mirpur-10 operates as both a residential and commercial sub-centre supported by vibrant vendor networks (RAJUK, 2021). The introduction of metro stations in these areas has reconfigured mobility patterns and spatial practices, presenting new opportunities for vendors through increased pedestrian circulation (Tariquzzaman, 2019). At the same time, it has introduced risks in the form of stricter regulations, displacement pressures, and intensified competition from formalised businesses (Bhowmik, 2010). Informal vendors, despite their integral role in the everyday life of transit-oriented spaces, are frequently marginalised in urban planning discourses (Crossa, 2009). These dynamics foreground critical questions concerning inclusivity in urban development and the resilience of informal economies under conditions of rapid infrastructural change.

Existing literature highlights the precarity of informal vendors when confronted with urban transformation and formalisation processes (Bhowmik, 2005). However, research remains limited regarding how large-scale transport infrastructure projects directly shape vendors’ livelihoods in the Bangladeshi context. Addressing this gap, the present study examines the socio-economic conditions and spatial implications of the Farmgate and Mirpur-10 metro stations for small-scale vendors. It situates informal vending within broader debates on urban transformation, resilience, and equity, thereby contributing to an enhanced understanding of how infrastructure-led development reshapes opportunities, vulnerabilities, and inequalities in rapidly urbanising cities.

The study specifically aims to analyse how metro-induced changes affect vendors’ income, access to space, customer flows, and regulatory challenges. Accordingly, it asks: (i) how has the opening of metro stations in Dhaka impacted the livelihood conditions of informal vendors in adjacent areas? and (ii) how do the livelihood outcomes of vendors who began operations before the stations’ inauguration differ from those who started afterwards? By addressing these questions, the research highlights the need for inclusive planning frameworks that recognise the socio-economic significance of informal vendors and integrate their roles within evolving transit-oriented urban landscapes.

2. Literature Review

2.1 The Impact of MRT Projects on Informal Vendors

Informal vendors who work in areas where new transport infrastructure projects reform urban dynamics, such as Mass Rapid Transit (MRT) projects, often find their livelihoods radically transformed (Choi, 2015). Although these developments seek to improve mobility, reduce congestion, and develop urban landscape (Man et al., 2024), the displacement of these vendors is a common

consequence of these initiatives due to construction, zoning modifications, and the formalization of urban areas (Spire & Choplin, 2018). Nevertheless, when combined with inclusive urban planning strategies, these MRT projects provide chances to rethink vendor integration through the defined vending zones, better accessibility, and increased pedestrian traffic (Selwyn, 2018).

In Jakarta, even though the development of the MRT project initially displaced the majority of the vendors along Jalan Sudirman and Thamrin (Silver, 2016), subsequent programs such as Jakpreneur and designated micro-business zones have significantly supported business success among new vendors (Wijaya & Nuringsih, 2022). Moreover, while the extension of Delhi's Metro caused displacement at first, it subsequently worked with the National Association of Street Vendors of India (NASVI) to include defined vending zones near stations, in compliance with the Street Vendors Act, 2014 (Bose & Saxena, 2017). Conversely, the extensions of Manila's LRT and MRT have resulted in recurrent vendor evictions in locations like EDSA and Cubao, with inadequate enforcement measures facilitating cycles of informal reoccupation and eviction (Boquet, 2017). However, working along with vendor unions, São Paulo, Brazil, established inclusive regulations for regulated vending around metro stations, which helped to prevent early displacement and encourage negotiated reintegration (Nogueira & Shin, 2022). Following these examples of a wide spectrum ranging from exclusionary modernization in Manila to contested negotiation in Jakarta and Delhi and, finally, progressive inclusion in São Paulo, this research seeks to investigate the impact of metro-induced urban transformations on vendors' income, access to space, customer flow, and regulatory challenges in the post-construction of the Dhaka MRT.

2.2 Informal Vendors in Dhaka

Informal vendors in Dhaka, without a recognized enterprise framework, sell their products and services directly in public places like streets, marketplaces, and transportation hubs (Lata et al., 2019). This informal economy provides livelihoods to millions and helps the urban poor (Chen, 2016). However, informal vendors face challenges like evictions, police interference, lack of designated vending zones, and poor infrastructure (Ankhi et al., 2024)

As street hawkers are not officially recognized as part of the formal workforce, and their working conditions are often overlooked by authorities. Nonetheless, the government undertakes periodic interventions, including evictions, aimed at improving urban environments and facilitating better traffic and pedestrian movement. However, many renovation efforts have been undermined by market syndicates, local criminal groups, and corrupt law enforcement officials. Challenges to successful relocation are not solely external; hawkers themselves often resist moving from their established vending sites despite verbal assurances from officials, even when formal plans exist to relocate them to renovated spaces (Rayhan et al., 2019). Authorities also fail to adequately consider the negative impacts on vendors' livelihoods caused by such relocations and evictions.

Conversely, Dhaka's informal vendors face numerous obstacles due to insufficient resources, unsafe working conditions, and inadequate infrastructure (Habib, 2016). Working in open areas with minimum shade exposes them to harsh weather conditions and also weather-related health risks. Inadequate waste management and toilet facilities contribute to an already unhygienic working environment (Habib, 2016). Moreover, vendors have to bribe municipal authorities and political personnel to secure their positions and escape legal consequences. Informal vendors are vulnerable to financial upsets and health problems since they do not have access to social security benefits such as health insurance and health-related facilities (Lata et al., 2019). While registration and licensing have been recommended as efforts to formalize informal vending, their application is still limited. They are particularly vulnerable to economic emergencies and health problems due to the informal nature of their work (Husain et al., 2015).

Due to their necessary services and support in the local economy, informal vendors are common characters in Dhaka's urban environment. To address the challenges that informal vendors face, city planners must take several measures, including setting up designated vending zones, supplying essential facilities and infrastructure, defending against extortion, and enrolling in social-support

programs (Etzold et al., 2013). To ensure an inclusive and urban environment, sustainable solutions must reintegrate the vendors' demands with the urban planning goals.

2.3 Sustainable Livelihood Framework for Informal Vendors

This study accepts the Sustainable Livelihoods Framework (SLF) to understand the livelihood conditions of the informal vendors impacted by the development of the Dhaka MRT. The SLF, developed by the UK's Department for International Development (DFID), provides a general perspective on poverty, highlighting the complex nature of livelihood choices and the importance of various forms of capital—human, social, natural, physical, and financial (DFID, 2001) (Figure 1). Serrat (2008) elaborated on the livelihood assets that include health, education, knowledge, and skills, etc., as human capital; networks and connections, etc., as social capital; environmental services, etc., as natural capital; infrastructure, tools, and technology, etc., as physical capital; and savings, wages, etc., as financial capital.

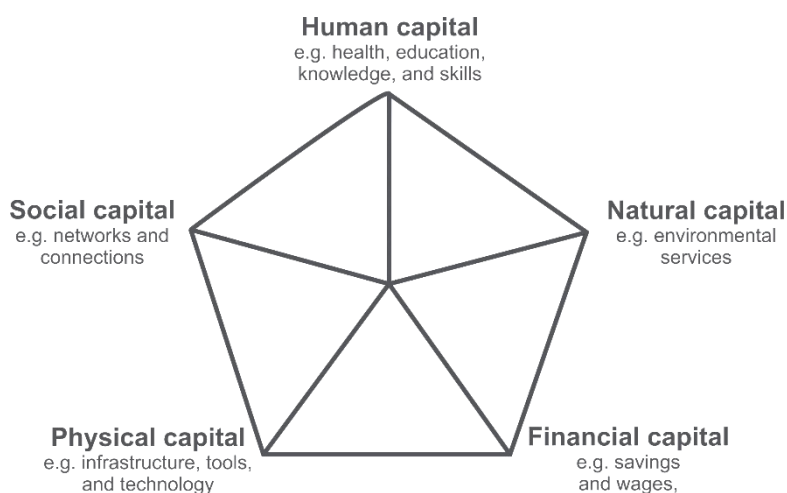


Figure 1. The five core assets identified by the Sustainable Livelihood Framework.

Source: Modified by Authors after DFID (2001) and Serrat (2008).

This framework provides a valuable lens for analyzing the situation of informal vendors around Dhaka metro stations by focusing on their assets, vulnerabilities, and coping strategies that shape their livelihoods through an “environmentally, economically, and socially sustainable” process. Among the five capitals (Figure 1), social capital has the most impact on vendors' access to capital as a whole, through its effects on financial and human capital (Mondal, 2017). Hossain et al. (2022) explained that a higher surplus income per day allows them to put more money into financial capital and gives them more chances to increase human capital by providing better education and living conditions for their children. Moreover, Peña (1999) emphasized that the informal vendors struggle to gain more control over their physical assets by collective collaboration and periodic confrontation. Hence, this research adopts the Sustainable Livelihoods Framework (SLF) to seek the impacts of monitoring environments on the various forms of core assets and to analyze the livelihoods of the informal vendors through this framework. Thus, the study hypothesizes:

- Primary Hypothesis (H_1):

Informal vendors who changed their vending location after the opening of the metro station have significantly better Sustainable Livelihood Framework (SLF) scores compared to those who did not.

- Null Hypothesis (H_0):

There is no significant difference in SLF scores between vendors who changed their vending location and those who did not after the metro station opened.

3. Methodology

3.1 Research Design

This study employs a mixed-method research design, integrating quantitative and qualitative approaches to examine the impact of Dhaka Metro Rail Transit (MRT) on informal vendors' livelihoods through the Sustainable Livelihood Framework (SLF). Two high-footfall MRT stations—Farmgate and Mirpur-10—were selected for their strategic significance and concentration of vending activities. Figure 2, illustrates the Research Methodology Framework

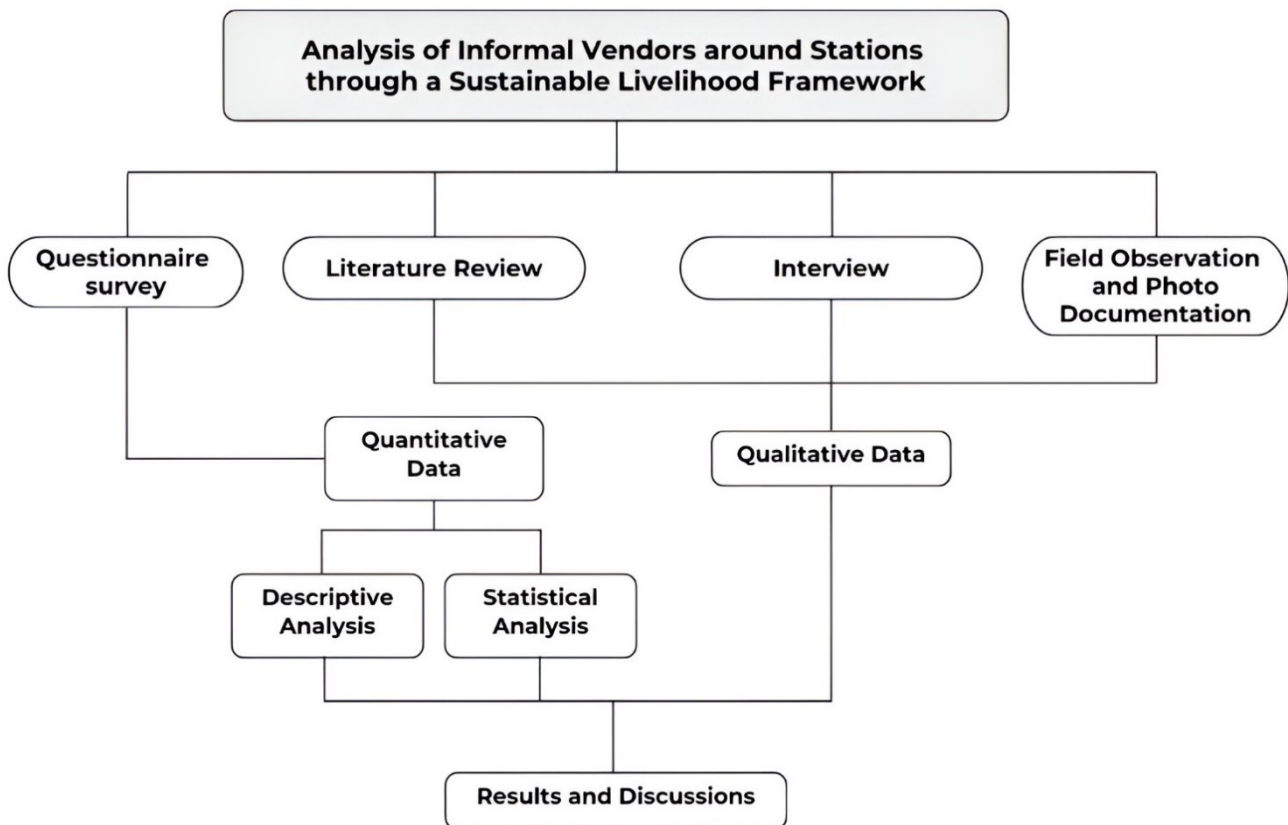


Figure 2. Research Methodology Framework.

3.2 Data Collection Methods

Primary data was gathered through site observations, transect walks, photographic documentation, user pattern analysis, and structured questionnaires, supported by contextual analysis using land-use maps and relevant literature.

3.2.1 Sample size:

A total of 50 vendors (25 from each site) were selected using purposive sampling to ensure diversity in vending types and experiences.

3.2.2 Questionnaire Design

The questionnaire was designed to reflect the components of the SLF, structured into five main sections:

- Human Capital – education level, skills, and health;
- Social Capital – support networks, peer relations, and customer base;
- Natural and Physical Capital – access to infrastructure, vending space, and weather impact;
- Financial Capital – income level, savings, credit access;
- Livelihood Strategies and Outcomes – coping mechanisms, changes in earnings, and perception of business sustainability.

The questionnaire included both closed-ended and Likert-scale questions to quantify the SLF dimensions, alongside open-ended questions to capture vendors' perspectives in their own words.

3.3 Data Analysis

3.3.1 *Quantitative Analysis*

Descriptive and statistical analyses were used to outline vendor demographics, livelihood strategies, and business conditions. To test the research hypothesis, two two-tailed independent sample t-tests were conducted:

- Comparing the mean SLF scores of vendors who started vending before vs. after the metro station opening.
- Comparing vendors who changed vs. did not change their vending location after the station became operational.

In addition, a Spearman's rho correlation assessed the relationship between location satisfaction and weather impact. These tests provided insight into how spatial changes, adaptive strategies, and environmental perceptions relate to livelihood sustainability.

3.3.2 *Qualitative Analysis*

Open-ended responses, observations, and photos were thematically analyzed to capture vendor narratives on customer flow, enforcement, and peer support.

3.3.3 *Ethical Considerations*

The research adhered to basic ethical standards. Participation was voluntary, and informed consent was obtained from all respondents before data collection. Vendors were assured of confidentiality and anonymity, and no identifying personal data was recorded. Sensitive topics were handled with care.

This integrated methodology allowed for a robust, comparative understanding of the impacts of metro station development on informal vendors, capturing both quantifiable livelihood indicators and lived, context-specific experiences.

3.4 Research Area

This research was conducted in two of the most dynamic areas of Dhaka—Farmgate and Mirpur 10 stations (Figure 3)—due to their strategic locations, role in transportation and connectivity, and socioeconomic activities.

3.4.1 *Farmgate Area*

Farmgate, located in the central part of Dhaka, Bangladesh, has undergone a significant transformation from its early 20th-century agricultural origins to become a vibrant commercial and transportation hub. It serves as a central traffic hub in Dhaka where several major routes (e.g., Green Road, Panthapath, and Kazi Nazrul Islam Avenue) intersect (Figure 4). The area is marked by a juxtaposition of formally planned residential blocks and spontaneously developed commercial zones, illustrating the complex, layered development of Dhaka's urban landscape. A footbridge facilitates pedestrian mobility across the four major intersecting roads, further reinforcing the area's role as a central hub for circulation and commercial activity. Despite recent infrastructural advancements, including the integration of a Metro Rail Station, Farmgate continues to experience severe traffic congestion and overcrowding, indicative of the overarching issues associated with the rapid urbanization of the city (Ahmed, 2024). Located within Dhaka North City Corporation (DNCC), Farmgate encompasses Indira Road, a corridor characterized by intense pedestrian traffic and vehicular flow. This route also hosts a high concentration of informal vendors, who contribute to the local economy while facing limitations in spatial and legal recognition.

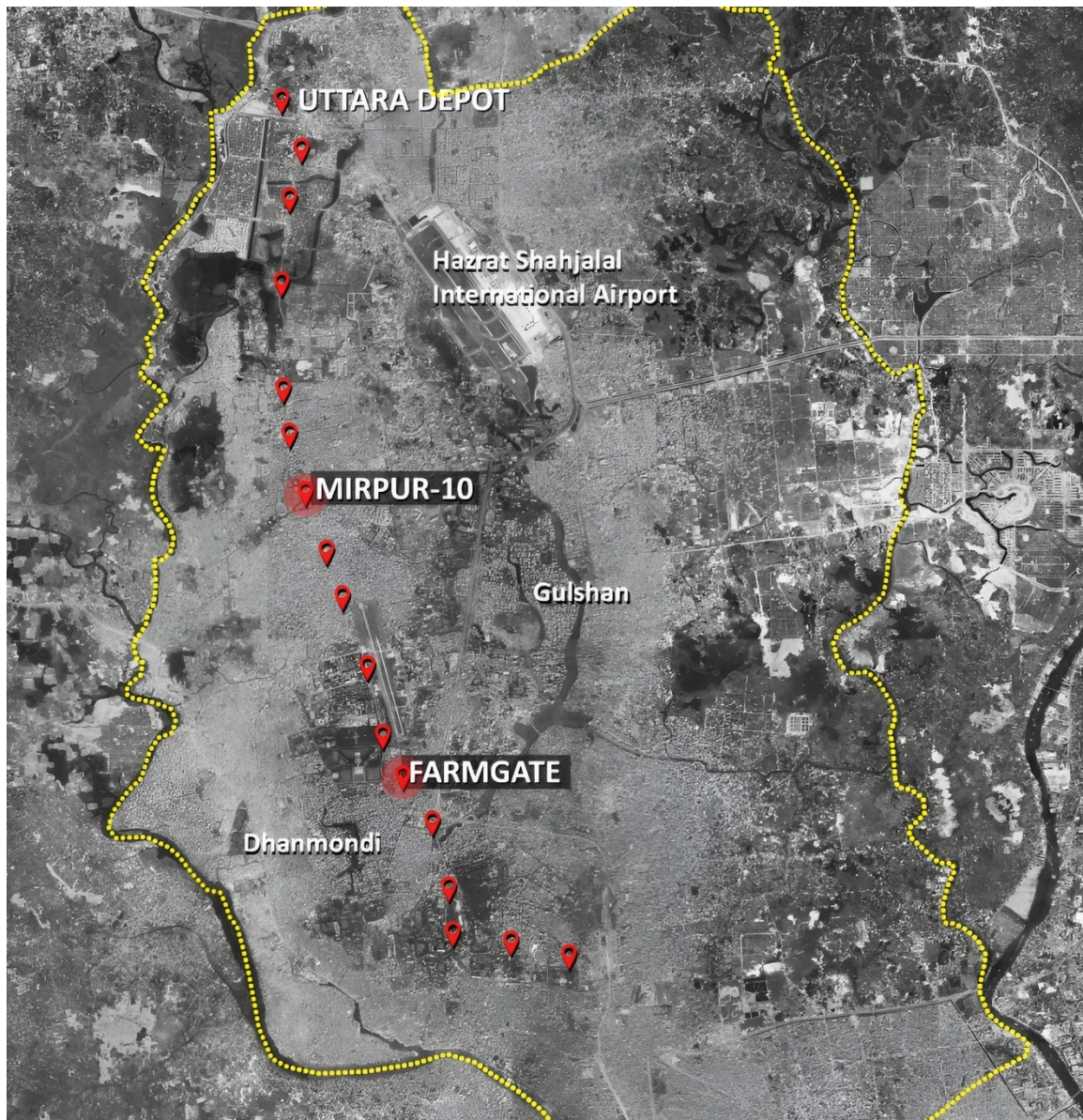


Figure 3. Dhaka Metro Line -6 route and study stations (Farmgate and Mirpur 10).

3.4.2 Mirpur Area

Mirpur, originally established as a riverside village around 1610, developed gradually around the Shah Ali Mazar shrine. The area derives its name from the Mughal-era elite class known as the "Mirs." In the aftermath of the 1971 Liberation War, Mirpur experienced substantial urban growth, facilitated by government-led land allotments and planned housing initiatives. The establishment of key institutions such as the National Botanical Garden (1962), the Bangladesh National Zoo (1974), and the Sher-e-Bangla National Cricket Stadium (2006) further enhanced the area's visibility and appeal. The Dhaka Metro Rail (2022–2023) has significantly improved connectivity and accelerated economic and social transformation in the Mirpur area, transforming it from an underdeveloped area to a dynamic urban zone with over 1.8 million residents (Hossain, 2024). Mirpur-10 is a key node along MRT Line 6 and functions as a sub-center, linking various sectors of Mirpur with greater Dhaka (Figure 4). The area exhibits a blend of formally planned residential blocks and spontaneously developed commercial corridors. The central roundabout serves as a prominent urban landmark, frequently congested with both vehicular and pedestrian traffic. A footbridge facilitates pedestrian movement across the four intersecting roads, contributing to the area's high volume of circulation and commercial activity, along with several bus stops, resulting in heavy traffic as well.

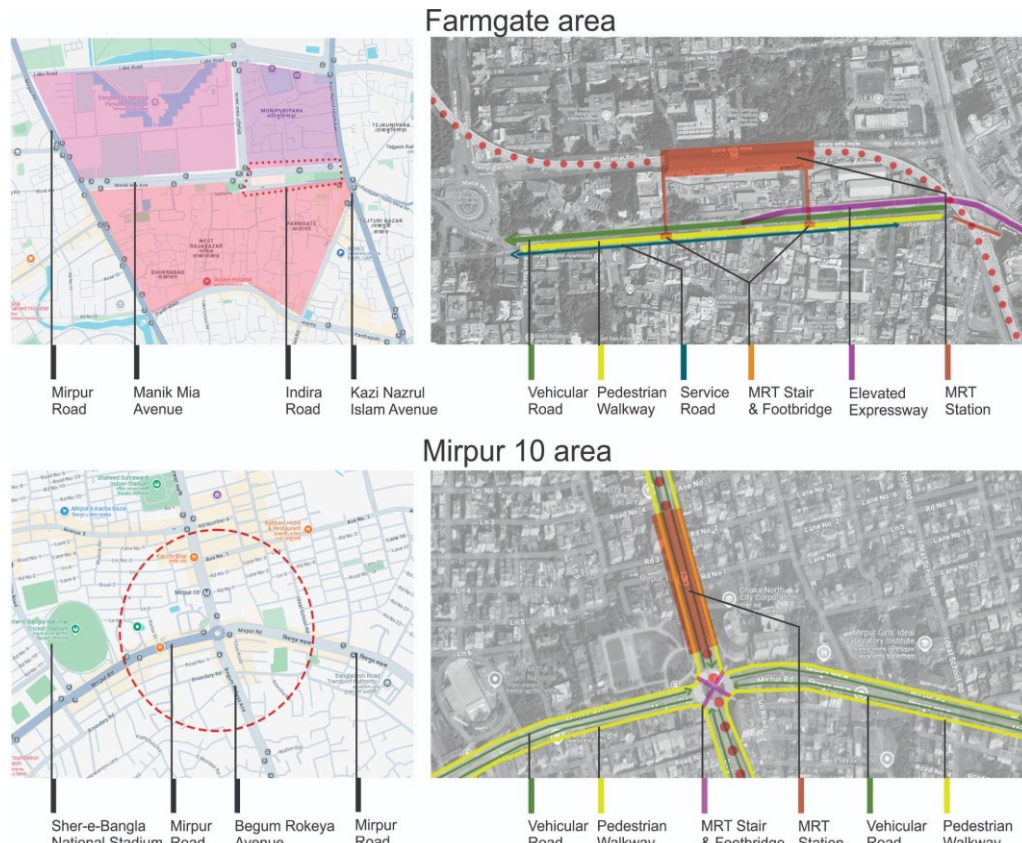


Figure 4. Farmgate and Mirpur 10 area: MRT station, surrounding routes, and connectivity.

The selected areas, Farmgate and Mirpur-10, both illustrate the dynamic interplay between historical legacy and contemporary urban development in Dhaka. While Farmgate reflects a transition from agricultural roots to a central urban hub, Mirpur-10 embodies a narrative of historical resilience and rapid modernization. Together, they highlight the diversity that drives Dhaka's urban evolution.

4. Findings

4.1 Overview

Table 1 presents a comprehensive assessment of small-scale vendors operating around metro station areas of Farmgate and Mirpur, focusing on business dynamics, challenges, and adaptations since the introduction of the Dhaka Metro Rail. The findings are elaborated below.

4.1.1 Demographic Profile and Business Tenure

The vast majority of respondents are male (94%), with only 6% identifying as female, highlighting the gender disparity within the informal vending sector in the study area. Regarding business experience, 38% of the vendors have been in business for less than one year, and 36% have been operating for 1–3 years. These statistics indicate a recent influx of new vendors, likely influenced by the increased foot traffic and economic opportunities surrounding the metro stations. Only 10% have sustained their business for over six years.

4.1.2 Impact on Business Dynamics

A significant portion (42%) of vendors began their businesses before the metro station became operational, while 58% entered the market afterwards, suggesting the metro acted as a catalyst for new vendors. The influence of the metro on customer behaviour and sales is clear: 90% of respondents reported an increase in both customer numbers and sales since the station's opening. Additionally, when asked to rate the metro station's effect on their business, 40% indicated a “significant” impact, followed by 30% selecting “very significant” and another 30% “somewhat” changed—none reported no change, reinforcing the metro’s pivotal role in enhancing business potential.

Table 1: Vendor profile in the study area.

Variables	Categories	Frequency	Percentage (%)
Gender	Male	47	94
	Female	3	6
Years in business	Less than a year	19	38
	1-3 years	18	36
	4-6 years	8	16
	More than 6 years	5	10
Start of business after the opening of the metro station	Yes	29	58
	No	21	42
Perception of the change in customer numbers after the opening of the metro station	Increased	45	90
	Decreased	5	10
How much will you rate the metro station for changing your business?	Somewhat change	15	30
	Significant change	20	40
	Very significant change	15	30
Have you ever faced any regulatory actions (e.g., eviction, fines)?	Never	15	30
	Frequently	27	54
	Always	8	16
If yes, how did you adapt?	Relocate	34	68
	Wait	10	20
	Mediate	6	12
What will you do if you are displaced from this current location?	Relocate	29	58
	Wait	20	40
	Mediate	1	2
What are the biggest challenges that you experience?	Reduced customer	1	2
	High competition	5	10
	Police intervention	14	28
	Lack of facilities (water, shading, etc.)	20	40
	Other	5	10
	None	5	10
What support do you think would improve the business environment?	Designated vending area	23	46
	Access to microfinance	9	18
	Training program	5	10
	Improve infrastructure (waste bin, shaded area)	13	26

4.1.3 Regulatory Challenges and Adaptation Strategies

Despite the opportunities presented, regulatory challenges persist. Over half of the respondents (54%) reported frequently facing regulatory actions such as eviction or fines, while 16% stated they are always subjected to such interventions. Only 30% reported never encountering these issues. In terms of adaptation, a majority (68%) chose to relocate as a response to regulatory or environmental pressures, with 20% opting to wait and 12% attempting mediation.

4.1.4 Additional Daily Challenges

When identifying their biggest challenges, 40% of respondents reported the lack of basic facilities such as water and shade, followed by 28% vendors mentioning police intervention. High competition (10%) and customer reduction (2%) were also noted, while 10% mentioned other factors.

4.1.5 Suggested Support Measures

When asked what forms of support would enhance their business viability, 46% of vendors complained about the absence of designated vending zones, reflecting a demand for legal recognition and spatial security. Infrastructure improvements (e.g., waste bins, shaded areas) were the second most desired support (26%), followed by access to microfinance (18%) and training programs (10%).

4.2 Comparative Analysis of Vendors

This section analyzes the working conditions and resilience of small-scale vendors operating around the Farmgate and Mirpur-10 metro stations in Dhaka. By applying the Sustainable Livelihood

Framework (SLF), the data is organized into five capitals—human, social, natural, physical, and financial—to portray how Metro Rail Development is influencing the everyday lives and business sustainability of informal vendors in the two urban contexts. Table 2 presents the findings.

Table 2: Comparative survey of the Sustainable Livelihood Assets of vendors at two different sites.

Capitals	Variables	Categories	Frequency in Percentage (%)	
			Farmgate	Mirpur
Human capital	What type of skills or training have you received for your work?	None	80	100
		Professional experience	20	0
		Training/ academic knowledge	0	0
	How do you protect yourself for health issues while working?	Do nothing	80	56
		Wear mask	20	44
	Do you send your children to school?	Yes	20	44
		No	80	56
Social capital	Are you a member of any vendor association or groups?	Yes	40	0
		No	60	100
	How much will you rate the effectiveness of those groups for business?	Very slightly effective	0	16
		Slightly effective	40	0
		Somewhat effective	20	0
		Significantly effective	20	0
		Very significantly effective	20	84
	What support system do you rely on?	Family/ friend	60	48
		Loans from NGOs and cooperatives	10	0
		Microcredit from banks	10	0
		Personal savings	20	52
Natural capital	What environmental challenges do you face while working?	Heatwaves	56	32
		Excessive rainfall	44	20
		Water logging	0	36
		Air pollution	0	12
	How much the weather impacts your daily business?	Very slight impact	20	0
		Slight impact	20	0
		Moderate impact	0	16
		Significant impact	60	20
		Very significant impact	0	64
	How do you adapt to weather? (Such as heavy rain, heatwave)	Temporary closure of shops and wait	80	64
		Coping mechanism (install fan, shade)	20	20
		Sell less	0	16
Physical capital	Do you own the cart/stall/table?	Yes	100	100
		No	0	0
	How much space do you use for vending?	No need	0	16
		15 ft ²	25	44
		20 ft ²	25	40
		25 ft ²	20	0
		30 ft ²	15	0
		50 ft ²	15	0
	Which services can you access from your work place?	None	0	36
		Only electricity	0	64

Financial capital	Electricity, water, and sanitation	100	0
		100	100
	Shared services from nearby shopping mall and public toilets		
	Changes in sales due to metro station	Increased	80
		Decreased	20
	Monthly savings (in BDT)	None	0
		1-2000	80
		2001-5000	0
		More than 5000	20
	Which financial supports can you access?	No support system	20
		Loans from family/friend	40
		Microcredit from bank	0
		Personal savings	40

4.2.1 Human Capital

In terms of training, a striking majority of vendors from both Farmgate and Mirpur have not received any form of formal skills training for their work. While 20% of Farmgate respondents claim to have some professional experience, none of the Mirpur vendors reported the same, highlighting a broader gap in capacity-building opportunities for informal workers. Health management practices during work also reveal a disparity between the two areas. In Farmgate, 80% of vendors do nothing to manage health issues, whereas in Mirpur, 44% take the minimal precaution of wearing masks. The data also shows that most vendors do not send their children to school. In Farmgate, 80% of respondents said their children do not attend school, while the figure in Mirpur is slightly lower at 56%.

4.2.2 Social Capital

Farmgate vendors are comparatively more engaged in collective structures. About 40% of vendors here are members of vendor associations or groups, while none of the Mirpur vendors reported any group affiliation. However, even within Farmgate, perceptions of the effectiveness of such groups are mixed—many respondents rated them as only slightly or somewhat effective. In terms of everyday support systems, both groups largely rely on informal sources. In Mirpur, 52% depend on personal savings, while 48% turn to family and friends. Farmgate shows a similar trend, with 60% depending on familial support. Access to institutional credit or microfinance remains virtually non-existent for vendors in both areas.

4.2.3 Natural Capital

Vendors from both sites face a range of environmental challenges. In Mirpur, waterlogging, excessive rainfall, and heatwaves are the most common issues. Farmgate vendors also reported heat waves and air pollution as prominent problems. These weather and environmental disruptions significantly affect daily business operations. The perceived impact of the weather is greater in Mirpur. Around 64% of Mirpur vendors consider the weather to have a very significant impact on their business, compared to only 20% in Farmgate. When dealing with harsh weather, most vendors resort to temporarily halting operations. About 80% of Farmgate vendors and 64% in Mirpur choose to close their shops and wait rather than make infrastructural adjustments such as adding fans or shades.

4.2.4 Physical Capital

Ownership of vending units is universal—every respondent from both Farmgate and Mirpur owns their cart, stall, or table. However, the amount of space used for vending varies. While 25% of Farmgate vendors use 20 square feet of space, 44% of Mirpur vendors operate within 15 square feet, indicating more compact operations in Mirpur. A notable difference appears in access to utilities. All Farmgate vendors reported access to electricity, water, and sanitation facilities, while in Mirpur, 36% have no access to utilities at all and 64% have only electricity. Both groups reported using shared services from nearby shops and malls.

4.2.5 Financial Capital

The opening of the metro station has influenced vendor incomes positively in both locations, but more so in Mirpur. All vendors from Mirpur reported increased sales, while 20% of Farmgate vendors saw a decrease. The difference might suggest that metro expansion brought more customers to Mirpur or that Farmgate vendors are facing crowding and competition due to older market saturation. When asked about savings, 56% of Mirpur vendors can save between 2,000 and 5,000 BDT monthly, and 44% do not have any savings. In contrast, only 20% of Farmgate vendors save more than 5000BDT. As for financial support systems, most vendors across both areas rely on personal savings and family assistance. Microcredit and bank loans are virtually unused.

4.2.6 Challenges and Support

Data presented in Figure 5 illustrates both the support mechanisms vendors consider critical to improving their businesses and the most pressing challenges they face in their daily operations in the selected research areas.

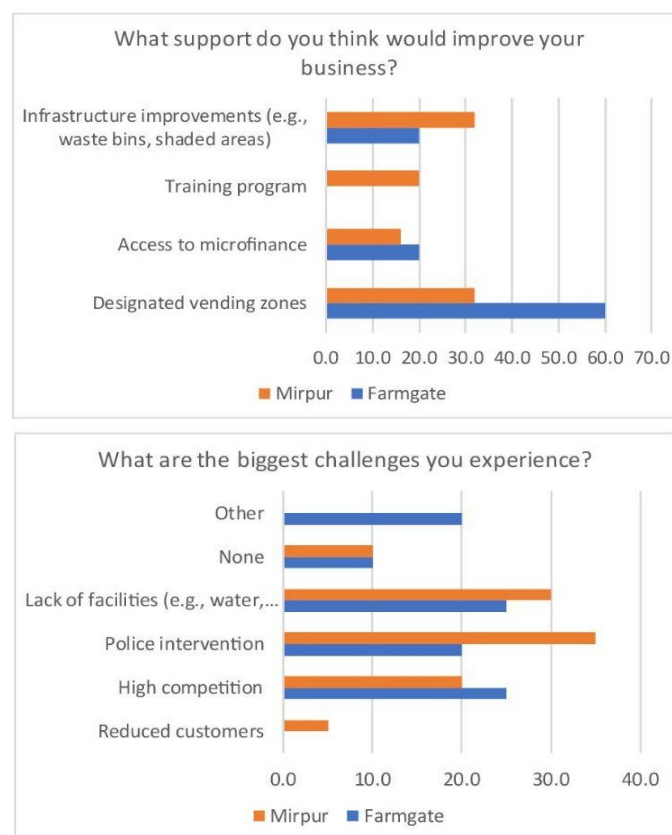


Figure 5. Support and Challenges in Mirpur-10 and Farmgate.

The establishment of designated vending zones emerged as the most strongly endorsed form of support, particularly in Farmgate, where approximately 60% of respondents indicated this as a priority. In contrast, a comparatively lower proportion of vendors in Mirpur (around 35%) emphasized this need. Infrastructure improvements—including waste management and provision of shaded areas—were also significant, particularly in Mirpur, where 35% of vendors expressed this need, followed closely by 20% in Farmgate. Training programs and access to microfinance were noted with moderate but consistent interest by vendors in both areas. Approximately 15–20% of respondents at each location indicated these as supportive measures, although these were considered as secondary to more immediate spatial and infrastructural needs.

The data also reveals key differences in the challenges faced by vendors at each location. In Mirpur, police intervention stood out as the most prominent issue, cited by around 35% of respondents. In

Farmgate, high competition (25%) and lack of facilities (nearly 30%) were the dominant concerns. A smaller proportion of respondents in Mirpur also identified reduced customer flow as a concern.

4.3 Customer Perspective

The data presented in Table 03 of the customer survey conducted near Farmgate and Mirpur-10 metro stations reveals critical insights into the role of consumer behaviour in shaping the livelihood outcomes of informal vendors. From a Sustainable Livelihood Framework (SLF) perspective, customer engagement serves as an essential external influence on vendors' financial capital and contributes indirectly to the formation of social and human capital. The majority of respondents (57%) reported using the metro daily, while 29% used it occasionally and 14% weekly. Importantly, 90% of these metro users buy goods or services from vendors near the station, indicating a strong consumer-vendor relationship at transit nodes. Among them, 38% make purchases daily and 42% weekly, confirming that vendors form an integral part of the metro station ecosystem and are relied upon for everyday needs. This finding highlights the economic capital component of the SLF—vendors are integrated into local livelihoods by catering to high-volume daily transit populations.

A large proportion of customers (76%) were satisfied, while 5% were fully satisfied, showing a generally favorable perception of vendor services. This satisfaction correlates with the motivations cited: 39% valued convenience, and 37% emphasized affordable prices, followed by quality of goods (13%) and variety (11%).

Table 3: Customer perception of vendors around metro stations.

Variables	Categories	Frequency	Percentage (%)
Frequency of Metro use	Daily	12	57
	Weekly	3	14
	Occasionally	6	29
Do you buy goods/services from vendors near the station?	Yes	19	90
	No	2	10
If yes, how often?	Daily	8	38
	Weekly	9	42
	Occasionally	2	10
	Never	2	10
How would you rate your level of satisfaction on these vendors?	Unsatisfactory	1	5
	Somewhat Satisfied	3	14
	Satisfied	16	76
	Maximum Satisfaction	1	5
What motivates you to purchase from these vendors?	Affordable prices	14	37
	Convenience	15	39
	Quality of goods	4	13
	Variety	5	11
Have you noticed any changes in the number of vendors recently?	Increased	20	95
	Decreased	0	0
	No change	1	5
What challenges do you experience from these vendors?	Inadequate waste management	11	22
	Congestion	19	38
	Lack of walkability	20	40
	Others	0	0
What improvements would enhance your experience?	Better waste management	16	35
	Organized vendor spaces	21	47
	Improved safety	8	18
Do you think vendor space should be incorporated in the design of metro stations?	Yes	11	52
	No	10	48
Should urban development plans formally allocate designated spaces for street vendors?	Yes	18	86
	No	0	0
	Not sure	3	14

Interestingly, 95% of respondents noticed an increase in the number of vendors near metro stations. While this increase reflects economic opportunity and the attractiveness of metro-linked zones for small-scale commerce, it also brings challenges. 40% cited lack of walkability, 38% identified

congestion, and 22% mentioned inadequate waste management. This points to a pressing need to address issues related to physical capital (infrastructure, mobility) and natural capital (cleanliness, waste control). When asked about potential improvements, 47% wanted more organized vendor spaces, 35% sought better waste management, and 18% prioritized improved safety. These responses emphasize public support for structured, well-managed vending environments. Furthermore, 86% of respondents agreed that urban development plans should formally allocate vendor spaces, reinforcing the argument for integrating informal vendors into urban governance and planning frameworks, aligning with the institutional context of the SLF. Notably, 52% supported incorporating vendor spaces in the design of metro stations, specifically, a sign of growing public consciousness about inclusive infrastructure.

4.4 Quantitative Analysis of Results

4.4.1 T-test to find the relationship between the mean SLF score and changing the vending location

An independent samples t-test showed that there was a difference in the mean SLF score between the 25 vendors who changed location after the opening of metro station ($M = 2.84$, $SD = 1.12$) and another 25 vendors those who did not change ($M = 2.00$, $SD = .75$), with $t(48) = 3.125$, and $p = .003$ indicating that the difference was statistically significant, shown in table 4.

Table 4: Mean difference of SLF score between vendors who have and have not changed vending locations after the opening of the metro station.

Change of vending location after the metro station opening		N	Mean	SD	t
SLF Score	No	25	2.00	1.118	3.125
	Yes	25	2.84	.746	
*P=.003					

According to these findings, the vendors who have changed their vending locations have a higher mean SLF score (mean difference = 0.84) than the vendors who did not change their location after the opening of the metro station.

4.4.2 T-test to find a relationship between the mean SLF score and the opening of the business before or after the metro station

Another independent samples t-test showed that there was a difference in the mean SLF score between the 21 vendors who have started business before the opening of metro station ($M = 3.48$, $SD = 0.51$) and another 29 vendors those who have started after the opening of metro station ($M = 1.66$, $SD = 0.48$), with $t(48) = -12.823$, and $p < .001$ indicating that the difference was statistically significant, shown in table 5.

According to these findings, the vendors who have started business in that location before the opening of the metro station have a higher mean SLF score (mean difference = 1.821) than the vendors who started business afterwards.

Table 5: Mean difference of SLF score between vendors who have started business before or after the opening of the metro station.

Timing of the metro station.					
	Started business after metro station opening	N	Mean	SD	t
SLF Score	No	21	3.48	.512	-12.823
	Yes	29	1.66	.484	
* $P<.001$					

4.4.3 Spearman's rho correlation test between the rating of the current location for best profit and the perception of weather impact on daily business

Spearman's rank order correlation was used to explore the relationship between the rating of the current location for best profit of the vendors and their perception of weather impact on daily business (Table 6). The correlation was found to be positive, strong rs (Spearman's rank correlation coefficient) (48) = 0.849, and highly significant with $p < .001$. Prior to calculating rs, visual inspection of the scatterplot confirmed that the relationship between these variables was non-linear and monotonic.

Table 6: Spearman's rho correlation test between the rating of the current location for best profit and the perception of weather impact on daily business.

		How much will you rate your current location as suitable for the best profit?	How much does the weather impact your daily business?
How much will you rate your current location as suitable for the best profit?	Correlation Coefficient	1.000	.849**
	Sig. (2-tailed)	.	.000
	N	50	50
How much does the weather impact your daily business?	Correlation Coefficient	.849**	1.000
	Sig. (2-tailed)	.000	.
	N	50	50

**Correlation is significant at the 0.001 level (2-tailed).

4.5 Observational Findings

The observational survey of Farmgate and Mirpur-10 metro stations reveals contrasting spatial dynamics in how informal vendors adapt to urban constraints. Figure 6 portrays the findings of how vendors occupy the streets in Farmgate and Mirpur-10 around metro stations.

At Farmgate, vendors are densely clustered along service roads and narrow pedestrian paths, as well as occupying the vehicular road along the pedestrian route, creating significant congestion. Three distinguished patterns can be seen in how they occupy the space, but in all cases, they occupy the vehicular street; however, it can be observed that they leave breathing space for pedestrian flow around the MRT Bridge entrance/exit. Their setups—often including shaded mobile/semi carts and waste bins—reflect an attempt to balance business needs with limited space and hygiene concerns. The spatial tension between pedestrian flow and vending activity is pronounced, as vendors rely on high footfall from nearby commercial zones, bus stoppages, and the metro station bridge entrance or exit. In contrast, Mirpur-10 displays a more dispersed pattern. Vendors operate across sidewalks, medians, and spaces beneath the elevated MRT station, as well as occupy the vehicular Mirpur Road, hampering the pedestrian flow and creating traffic congestion. Vendors in this zone appear to depend heavily on the steady commuter traffic generated by the metro station as well as the bus stoppages, positioning themselves for maximum visibility and footfall, but at the cost of pedestrian comfort and mobility. The three distinguished patterns shown in Figure 6 show how, in each route, the vendors occupy the pedestrian and vehicular roads.

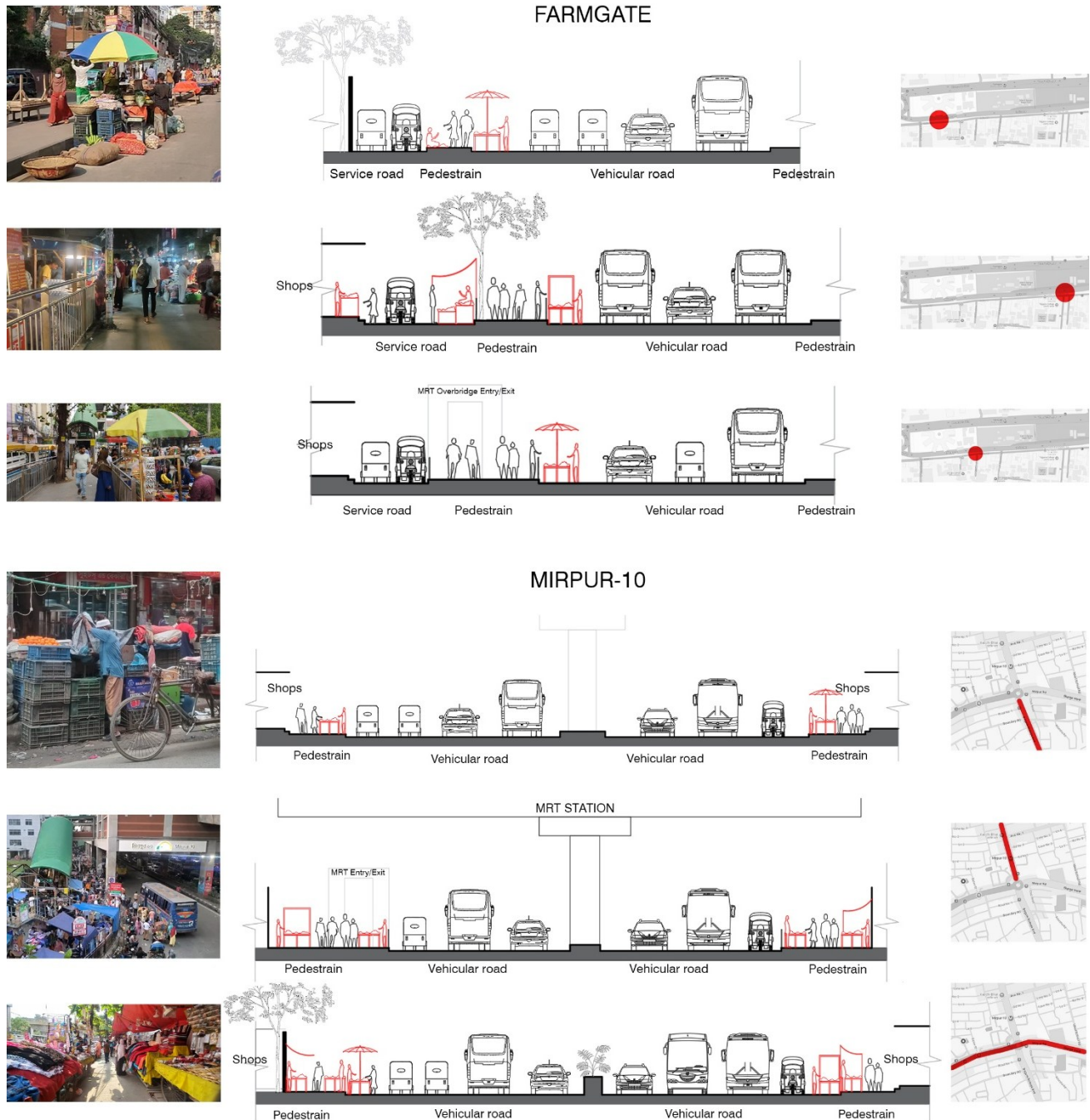


Figure 6. Observational Survey: vendors occupy the streets in Farmgate and Mirpur-10 around metro stations.

The field survey revealed that vendors have made a few adaptations. Figure 7 illustrates how some informal vendors in Dhaka have innovatively modified their physical environments and tools to adapt to infrastructural, climatic, and operational challenges. Often, mobile vendor carts are now equipped with light sources powered by batteries, allowing vendors to extend their working hours into the evening or operate in poorly lit urban areas. This adaptation not only increases potential income but also highlights the creativity and resourcefulness of vendors in utilizing alternative energy sources in the absence of reliable access to electricity. It reflects how informal vendors transform within infrastructural constraints to sustain livelihoods.

The second image of Figure 7 finding shows a semi-permanent stall equipped with built-in storage compartments for goods and a dedicated waste bin. These cart modifications represent vendor-led

innovations that improve functioning efficiency, enabling better inventory management and the ability to store goods, an essential strategy in areas with irregular supply chains or under the constant threat of eviction. The inclusion of waste bins further recommends an effort to maintain hygiene and order. The third image of Figure 7 shows a vendor arrangement that introduces temporary shading structures and a fan, which serve dual purposes: protecting workers from environmental stress (heat, sun) and enhancing customer comfort. These adjustments are particularly important in Dhaka's hot and humid climate, showing how vendors use limited means to create hospitable micro-environments. These physical adaptations are strategic modifications that enhance resilience, customer service, and operational sustainability in an unsupportive urban context.

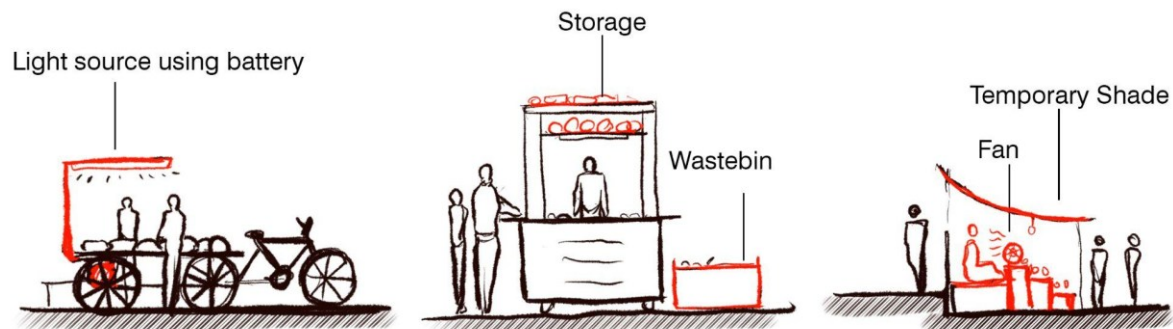


Figure 7. Vendors' adaptations to their physical capital.

5. Discussion

The integration of findings offers a comprehensive perspective on how the Dhaka Metro Rail—specifically around Farmgate and Mirpur-10 stations—has impacted the livelihood dynamics of informal vendors. By combining vendor-specific business outcomes with the Sustainable Livelihood Framework (SLF), this study reveals the impacts and broader vulnerabilities faced by these urban workers.

From Table 3, the findings underscore how informal vendors fulfil critical needs, especially for urban commuters, and are therefore a key part of the human and financial capital in SLF, offering practical, cost-effective alternatives in a dense urban economy. The data from Table 1 and 2 make it evident that the opening of metro stations has significantly altered the urban mobility landscape, catalyzing informal economic activities, especially for street vendors. The increased foot traffic around metro stations has translated into higher customer volumes for vendors. A notable 90% of surveyed vendors reported increased customer traffic and improved sales, indicating that the metro has positively impacted footfall-dependent businesses. Similarly, the t-test result on the changing of vending location (Table 4) also confirms that, based on the spatial position of the metro station, changing the vending location has positive impacts on the livelihood of vendors. The possible reason can be their connectedness with peers and awareness of changing pedestrian flow due to the integration of the metro station. This aligns with global literature suggesting that improved public transit infrastructure tends to boost pedestrian activity, which in turn benefits micro-entrepreneurs and footfall-dependent businesses (Cervero & Golub, 2007; Niger & Sinthia, 2025). Within the Sustainable Livelihood Framework (SLF), this improvement also reflects an increase in financial capital through enhanced income streams (DFID, 2001).

Despite increased sales and foot traffic, informal vendors continue to face structural vulnerabilities stemming from their precarious legal and spatial status. These statistics reflect the broader marginalization of informal economies in cities of the Global South, where vendors often operate in "zones of exception" that lack legal protection or integration into urban planning (Roy, 2005). Islam et al. (2019) also highlight that informal vendors face challenges such as evictions, police hindrance, the absence of specified vending zones, and inadequate infrastructure—findings that are clearly reflected in this research. Thus, the t-test result on the opening of the business before or after the metro

station (Table 5) shows the hypothesis is rejected since the vendors starting business after the opening of the station have a lower mean score. The rapid increase of vendors and their substandard vending management, along with a lack of adequate space and utilities, might be the causes. Therefore, there remains an opportunity to improve their standard of livelihood by providing the essential services and ensuring appropriate spatial integration in metro station design.

Moreover, the Sustainable Livelihoods Framework (SLF) reveals that this vulnerability manifests as frequent disruptions to business operations, either through legal harassment or environmental threats (DFID, 2001). To comprehend the environmental threats, Spearman's rho correlation test has been performed (Table 6) to analyze how the weather affected the business profit of these vendors. This correlation test shows a strong positive relation between the rating of the current location for the best profit of the vendors and their perception of the weather's impact on daily business. Since the vendors are vending under the open sky in a tropical city, weather impacts such as rainfall, heatwaves, and waterlogging are common challenges for them. Designated space within stations, protecting their business from these weather impacts, can significantly improve their livelihood.

However, in response to those environmental and administrative challenges, vendors have adopted various coping mechanisms. These adaptive behaviors show how people mobilize various forms of capital to maintain livelihoods according to the SLF. From the data, 68% of vendors reported relocating as a strategy to manage regulatory pressure, while others temporarily suspended their operations during environmental threats such as heavy rainfall or heat waves. These reflect a wider pattern of adaptive resilience commonly observed in informal economies, where vendors innovate plans under regulatory uncertainty, as highlighted by Brown et al. (2010). Additionally, the lack of access to stable utilities, described more frequently in Mirpur, forces vendors to rely on improvised solutions. Figure 7 illustrates how vendors have adopted various strategies to address utility-related challenges. Therefore, these responses also highlight the absence of formal support systems, reinforcing the vulnerability of informal livelihoods.

Social capital, a key component in the SLF, is noticeably underdeveloped among the surveyed vendors, particularly in Mirpur. None of the informal vendors from Mirpur-10 reported being part of any vendor organization or cooperative, compared to 40% in Farmgate. This difference suggests a spatial inequality in institutional engagement and collective capacity. As Skinner (2008) and Chen (2012) argue, the invisibility of the informal sector in policy discourse severely limits its ability to claim rights or negotiate protections. Vendor organizations can provide mutual support, advocacy, and protection, yet such networks remain absent in the research metro zones.

The comparative analysis between Farmgate and Mirpur-10 reveals complete contrasts in capital endowments across the SLF dimensions. Farmgate vendors benefit from better access to physical infrastructure, such as water and sanitation facilities, and exhibit stronger organizational ties. Conversely, Mirpur vendors, despite achieving higher income levels, face greater infrastructural and institutional neglect. This disparity in distribution of assets suggests that financial capital alone cannot ensure livelihood sustainability; robust physical and social infrastructure is equally essential (Scoones, 1998).

6. Conclusion

This study applied the Sustainable Livelihoods Framework (SLF) to evaluate the livelihood dynamics of informal vendors around Dhaka Metro Rail stations, focusing on Farmgate and Mirpur-10. The findings show that the introduction of the metro has altered vendors' economic opportunities by increasing customer flows and sales, although these benefits are unevenly distributed. Vendors who changed their vending locations after the metro's inauguration reported significantly higher SLF scores, underscoring the role of spatial adaptability in shaping livelihood outcomes. Conversely, those who established businesses after the metro opening achieved lower scores, revealing the vulnerability of late entrants in an increasingly competitive vending environment.

Despite the opportunities created by enhanced pedestrian mobility, vendors continue to experience structural vulnerabilities, including frequent evictions, lack of designated vending zones, limited

access to infrastructure, and exposure to adverse weather. Statistical analyses further highlight a strong correlation between perceived location profitability and vulnerability to climatic impacts, pointing to the precarious nature of vending in open urban environments. These findings demonstrate that while new transport infrastructure can stimulate economic opportunities, without supportive policy frameworks vendors remain trapped in cycles of insecurity.

The comparative analysis between Farmgate and Mirpur-10 highlights spatial inequities in access to assets and support systems. Farmgate vendors benefit from stronger organizational networks and better access to utilities, while Mirpur vendors enjoy relatively higher incomes but face inadequate infrastructure and institutional neglect. These disparities reveal that financial gains alone are insufficient to secure sustainable livelihoods; rather, integrated strategies that strengthen social, physical, and institutional capital are essential. This research contributes to broader discourses on inclusive urban development, demonstrating how metro-induced urban transformations intersect with informality, resilience, and inequality.

The study is limited to two metro stations, which constrains the generalisability of its findings across the wider Dhaka Metro Rail network. Future research should expand the scope to multiple stations, employ longitudinal methods to track changes over time, and incorporate gender-sensitive analyses to address the underrepresentation of women in informal vending. Strengthening the role of vendor associations, integrating designated vending spaces into transit-oriented planning, and addressing infrastructural deficits are critical for ensuring that informal vendors are not marginalised by urban transformation. By situating informal livelihoods within metro development strategies, policymakers can move towards more inclusive, resilient, and sustainable urban futures.

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The authors declare no conflicts of interest.

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The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

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